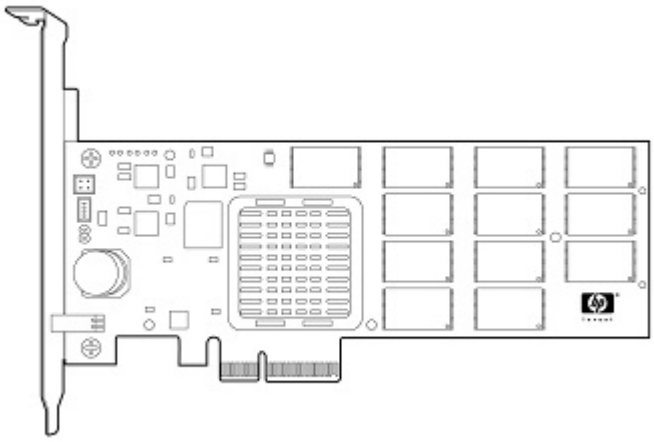
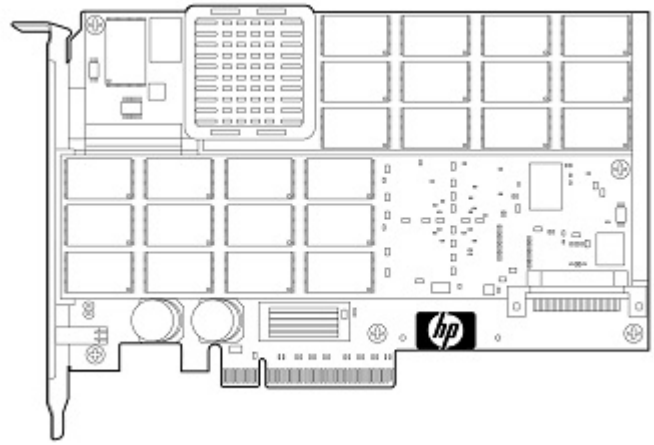
Overview

HP IO Accelerator for ProLiant servers is a direct attach solid state storage technology PCIe card based solution for application performance enhancement. Based on Multi-level cell (MLC) and Single Level Cell (SLC) NAND Flash technology these devices are ideal for Markets & Applications requiring high transaction rates and real-time data access.



ioDrive



ioDrive Duo

What's New

- Adding the new 1.28TB PCIe ioDrive Duo to the existing HP IO Accelerator family

Models

HP I/O Accelerator Options	HP 160GB SLC PCIe ioDrive	600278-B21
	HP 320GB MLC PCIe ioDrive	600279-B21
	HP 320GB SLC PCIe ioDrive Duo	600281-B21
	HP 640GB MLC PCIe ioDrive Duo	600282-B21
	HP 1.28TB MLC PCIe ioDrive Duo	641027-B21

Overview

Compatibility

Servers

ProLiant DL (rack-optimized):

- HP ProLiant DL160 G6
- HP ProLiant DL180 G6
- HP ProLiant DL360 G6
- HP ProLiant DL360 G7
- HP ProLiant DL370 G6
- HP ProLiant DL380 G6
- HP ProLiant DL380 G7
- HP ProLiant DL385 G6
- HP ProLiant DL385 G7
- HP ProLiant DL580 G5
- HP ProLiant DL580 G7
- HP ProLiant DL585 G6
- HP ProLiant DL585 G7
- HP ProLiant DL785 G5
  NOTE: Supports 600278-B21 and 600279-B21 only.
- HP ProLiant DL785 G6
  NOTE: Supports 600278-B21 and 600279-B21 only.
- HP ProLiant DL980 G7

ProLiant ML (expansion-optimized):

- HP ProLiant ML370 G6
- HP ProLiant ML350 G6

ProLiant SL (Scalable System)

- HP ProLiant SL160z G6

Standard Features

What is an IO Accelerator?

The IO Accelerator is an advanced storage device that uses solid state storage technology directly on the PCI bus, assuring high read and write data rates and accelerated application performance. The associated application performance improvements will have a positive impact on business results and the ability to make decisions quickly, resulting in significant cost and time savings.

Single Level Cell and Multilevel Cell

NAND technology uses flash memory cells to store data. Single level Cell (SLC) stores one bit per cell, while Multi-level Cell (MLC) uses two bits per cell. While MLC can store more data within each device, it has lower endurance characteristics than SLC.

IO and Read/Write Performance

HP PCIe IO Accelerator products offer superior IO performance (over 100,000 IOPs on certain products), and high read (up to 700MB/s) and write (up to 600 MB/s) performance with SLC models.

Latency

HP PCIe IO Accelerator offers very low latency access to data (as low as 50 microseconds to read a 4K block on SLC based products and 80 microseconds for MLC based products), in other words a virtually zero seek time compared to rotating magnetic media.

RAM Requirements

The amount of free RAM required by the driver depends on the size of the blocks used when writing to the drive. The smaller the blocks, the more RAM required. Here are the guidelines for each 80GB of storage:

Average Block Size (bytes)	System RAM usage (Megabytes) per 80GB of storage for Driver version 2.x	System RAM usage (Megabytes) per 80GB of storage for Driver version 1.2.x
8,192	225MB	400MB
4,096 (most common)	425MB	800MB
2,048	825MB	1,500MB
1,024	1,600MB	2,900MB
512	3,175MB	5,600MB

Manageability

Command Line (CLI) tools for both Linux and Windows to configure, monitor, and upgrade firmware
SNMP Agent and System Management Homepage provided for Linux and Windows
ioManager GUI for Windows and Linux

PCI IDs

Vendor & Device ID 1AED:1005; Subsystem Vendor & Device ID 103C:324E

Upgradeability

The IO Accelerator's controller can be upgraded in the future with new firmware. Online firmware update tools are available for all supported operating systems.

Wear-leveling

NAND Flash devices use semiconductor technology that has a finite number of data that can be written to the device, defined as the Maximum Lifetime. Projected lifetime of the NAND storage due to wear-out varies with type of NAND and amount of writes to the device. For SLC 11 years at 2.5TB/day writes duty cycle. MLC 6 years at 250GB/day writes duty cycle

Standard Features

Maximum usage

ioDrive		ioDrive Duo		
160GB	320GB	320GB	640GB	1.28TB
75 PB writes	4 PB writes	150 PB	8 PB writes	8 PB writes

NOTE: Subject to maximum usage limitations. Parts and components that have exceeded their maximum supported lifetime and/or the maximum usage limitations. Maximum supported lifetime-the period in years set to equal the warranty for the device. Maximum usage limit-This is the maximum amount of data that can be written to the device before write burn-out.

Data Integrity

Using advanced ECC techniques, the IO Accelerator can correct up to 11 bits out of every 240 bytes, with a design target of a 1 in 10 to the 20th Power probability of uncorrectable data and a 1 in 10 to the 30th Power probability of undetected bad data.

OS Support

RHEL 4,5,6 (64-bit support only)
SLES 10, 11 (64-bit support only)
Windows Server x86-64 2003, 2008 (64-bit support only)
CentOS
VMware ESX 4.0 Update 1
NOTE: The IO Accelerator is currently not supported as a boot device.

Configurations

Mixing of capacities is allowed, OS RAID

Warranty

3/0/0 warranty; Customer Self Repair (CSR) Subject to maximum usage limitations (Please see note under Additional Services Information).

Service and Support

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively

HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs-from purchase to equipment retirement.

Learn more: www.hp.com/services/servers and www.hp.com/services/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at http://www.hp.com/go/lookuptool

Recommended HP Care Pack Services for optimal satisfaction with your HP product

Recommended Services

Hardware Options Support

HP Care Packs provide support for all HP-branded hardware options qualified for inclusion in your server or storage solution. Any additional HP-qualified options installed within the server are covered at the same service level and for the same period as the server and no additional cost.

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE

3-Year HP Hardware Support Onsite Service, 4-hour response, 24x7

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE

HP Installation and Startup of HP ProLiant Servers

Provides for the installation of your new HP ProLiant server and operating system to assist you in bringing your new HP ProLiant server and operating system into operation in a timely and professional manner.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Delivery of the service at a mutually scheduled time convenient to your organization
- Availability of an HP service specialist to answer basic questions during the onsite delivery of this service
- Custom installation as detailed in "Delivery specifications" or in a Statement of Work (SOW)
- Verification prior to installation that all service prerequisites are met

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982?7572ENN

Optional HP Care Pack Services that will enhance your HP product experience

Optional Services

3-Year HP Hardware Support Onsite Call-to-Repair (CTR) Service, 6- or 24-hour
As an alternative to our recommended support level, for customers who need committed call-to-repair for server hardware.

Provides your IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 or 24 hours of the initial service request to the HP Global Solution Center.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf

3-Year HP Support Plus 24
As an alternative to our recommended support level, for customers who need access to responsive 24x7 hardware and software support plus software updates on HP and selected third party products:

For a higher return on your server and storage technology, our 3-year combined reactive support service delivers integrated onsite hardware/software support services available 24x7x365, including access to HP technical resources, 4-hour response onsite hardware support and software updates.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE

HP Proactive Select Service
Customer needs on demand access to consulting, technical proactive services and education courses

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN

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eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24

X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

Customer Technical Training

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: www.hp.com/services/proliant or www.hp.com/services/bladesystem or http://www.hp.com/hps/storage

NOTE: Supplies and consumable parts are not supported and will not be provided as part of this service; standard warranty terms and conditions apply to supplies and consumable parts.

Maximum supported lifetime/maximum usage:

- Parts and components that have exceeded their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual or the technical product data sheet will not be provided, repaired or replaced as part of this service.

Technical Specifications

HP 160GB SLC PCIe ioDrive 600278-B21	Usable Capacity	160GB
	Technology	NAND Flash, SLC
	Bandwidth (64kB)	750 MB/s Writes 770MB/s Reads
	Access Latency (512 Byte)	26 microseconds
	IOPS	123,000 IOPS (75/25 R/W)
	Form factor	Half Height/Half length-Low profile PCI Express x 4 slot (spec 1.1)
	Bus Interface	PCI Express x 4
	Power (Nominal)	PCI Express x 4 (power spec 1.1)
	Operating Temperature	0-55°C (Operational)/-40-70°C (non-operational)
HP 320GB MLC PCIe ioDrive 600279-B21	Usable Capacity	320GB
	Technology	NAND Flash, MLC
	Bandwidth (64kB)	510MB/s Writes 735MB/s Reads
	Access Latency (512 Byte)	29 microseconds
	IOPS	67000 IOPS (75/25 R/W)
	Form factor	Half Height/Half length-Low profile PCI Express x 4 slot (spec 1.1)
	Bus Interface	PCI Express x 4
	Power (Nominal)	PCI Express x 4 (power spec 1.1)
	Operating Temperature	0-55°C (Operational)/-40-70°C (non-operational)
HP 320GB SLC PCIe ioDrive Duo 600281-B21	Usable Capacity	320 GB
	Technology	NAND Flash, SLC
	Bandwidth (64kB)	1.5GB/s Writes 1.5GB/s Reads
	Access Latency (512 Byte)	26 microseconds
	IOPS	238,000 (75/25 R/W mix)
	Form factor	Full Height/Half Length PCI Express 2.0
	Bus Interface	PCI Express x 8 or PCI Express 2.0 x 4
	Power (Nominal)	PCI Express power spec 2.0
	Operating Temperature	0-55°C (Operational)/-40-70°C (non-operational)

Technical Specifications

HP 640GB MLC PCIe ioDrive Duo 600282-B21	Usable Capacity	640GB
	Technology	NAND Flash, MLC
	Bandwidth (64kB)	1.0GB/s Writes 1.5GB/s Reads
	Access Latency (512 byte)	29 microseconds
	IOPS	138, 000 IOPS (75/25 R/W mix)
	Form factor	Full Height/Half Length PCI Express 2.0
	Bus Interface	PCI Express x 8 or PCI Express 2.0 x 4
	Power (Nominal)	PCI Express power spec 2.0
	Operating Temperature	0-55°C (Operational)/-40-70°C (non-operational)
HP 1.28TB MLC PCIe ioDrive Duo 641027-B21	Usable Capacity	1.28TB
	Technology	NAND Flash, MLC
	Bandwidth (64kB)	1.1GB/s Writes 1.5GB/s Reads
	Access Latency (512 Byte)	30 microseconds
	IOPS	150, 000 IOPS (75/25 R/W mix)
	Form factor	Full Height/Half Length PCI Express 2.0
	Bus Interface	PCI Express x 8 or PCI Express 2.0 x 4
	Power (Nominal)	PCI Express power spec 2.0
	Operating Temperature	0-55°C (Operational)/-40-70°C (non-operational)
Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.